May 13, 1969 A. WARD 3,443,371

TEXTILE MACHINE

Filed Jan. 24, 1968 Sheet 1 of 2

FIG. 1

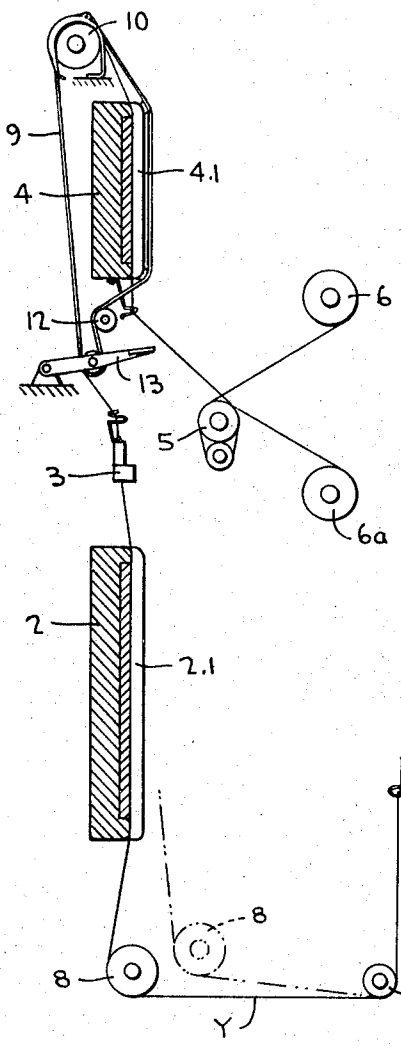
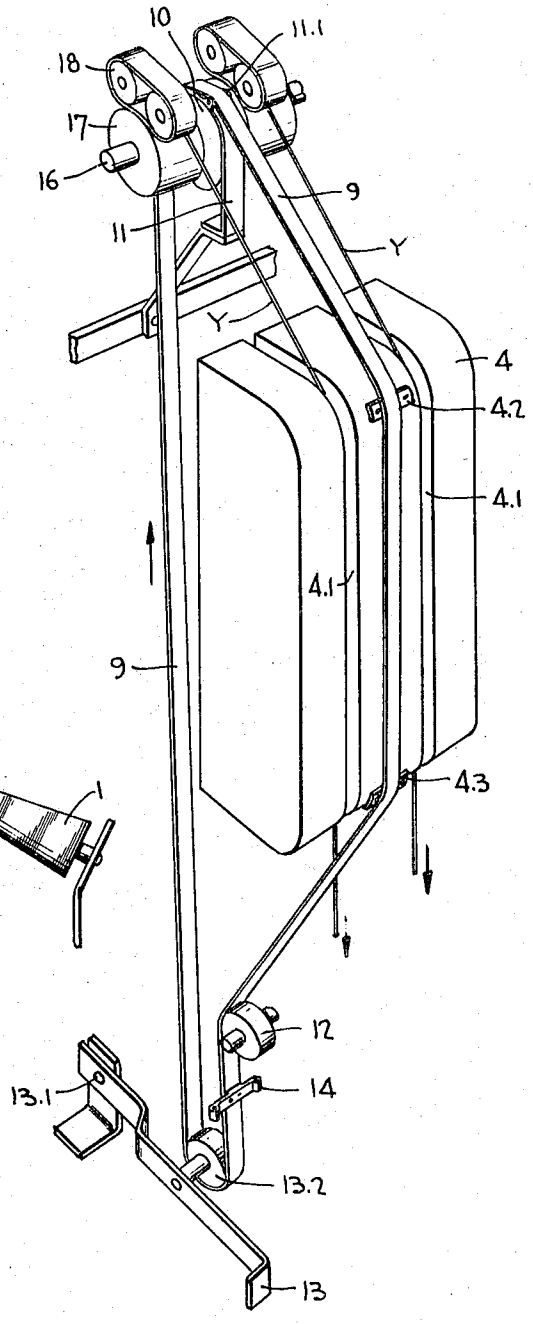


FIG. 2



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TEXTILE MACHINE

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FIG. 3

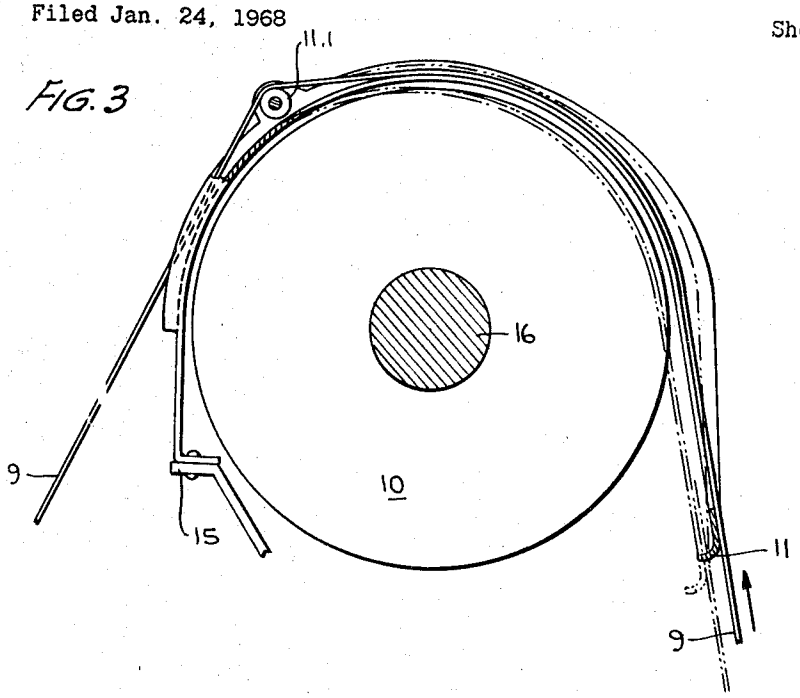


FIG. 4

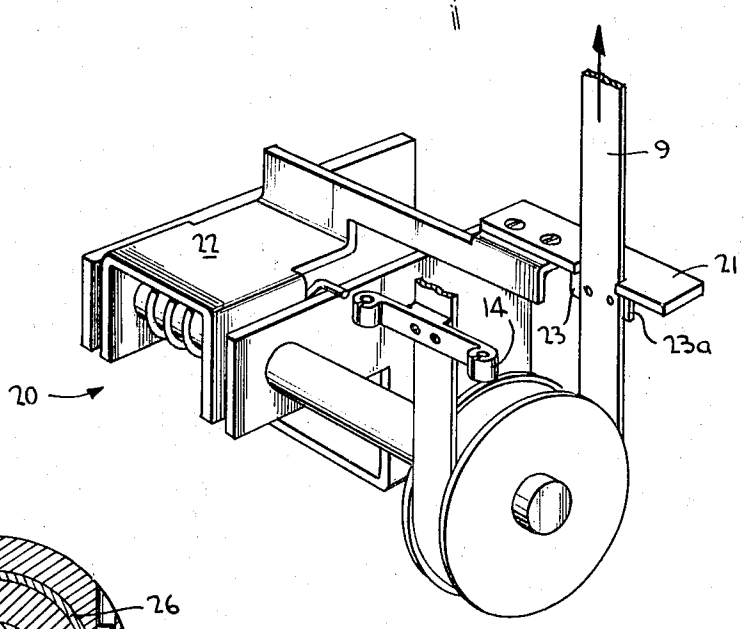
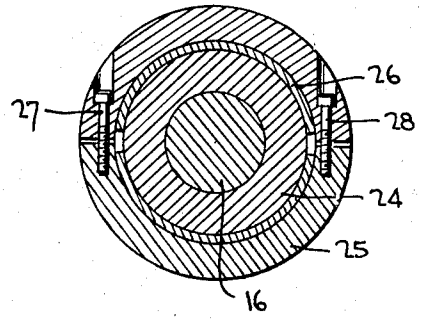


FIG. 5



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3,443,371

TEXTILE MACHINE

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Int. Cl. D01h 13/26, 13/04; D02j 13/00
U.S. Cl. 57—34 8 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for threading a textile machine comprising a double heater from a convenient level is described. The apparatus includes means for carrying a yarn strand up the back of a heater on a textile machine and over the top thereof into contact with the heated zone in front of the heater.

Field of invention and prior art

This invention is directed to an apparatus for treating yarn. More particularly, the invention is directed to an apparatus for threading a textile machine and specifically to threading yarn around heater means utilized on a textile machine.

Various processes and machines are known for treating yarn to impart stretch characteristics thereto including Stoddard et al. U.S. Patent No. 2,803,105, 2,803,108, 2,803,109, and 2,891,376; and Dudzik et al. U.S. Patent No. 3,152,436. In the techniques employed, it is necessary to heat the yarn after it is taken from the feed roll and before being fed through a false twist spindle where twist characteristics are applied to the heated yarn. The heated zone is correlated to the linear travel of the yarn to supply sufficient heat thereto to effect the proper yarn setting which reorients the molecules of the yarn in the twisted formation to produce the crimped or coil-like configuration characteristic of stretch yarn. Control of the temperature of the heated zone is necessary to avoid having the threads scorched and/or melted. Accordingly, as a result of increasing the speed of the twisting operation, i.e., the speed at which the yarn is fed to the twist spindle of the textile machine, to have the necessary residence time at the heater to impart the desired characteristics to the yarn, the length of heated zone has been increased to the point where the heated zone is relatively long.

More recently it has been found that advantageous characteristics are obtained in the yarn, at least for certain applications, by passing the yarn through a second heated zone after the yarn has been passed through the twist-imparting spindle. The post heating anneals, or resets the yarn to give a limited, or reduced, amount of stretch to the yarn. In the construction of textile machines for carrying out the heating and post heating process, as a pratcical matter, in view of the need to conserve space and the like, it is necessary to have one heated zone above the other, and accordingly to place the take-up package above, or at substantially the same level, as the top of the second heated zone. Accordingly, because of the length of the heated zones and the need to position ancillary equipment in alignment with the heated zones, it is necessary to employ a catwalk or a ladder to permit a machine operator to thread-up a twisting station. Because of the difficulty of constructing a catwalk and the dangers and inconvenience of having an operator use a catwalk or a ladder, the aforesaid features are a distinct disadvantage.

Objects and general description of the invention

It is another object of the invention to provide an improved apparatus for the threading up of the textile machine.

It is another object of the invention to permit the threading of double heaters on a textile machine from one convenient level.

It is another object of this invention to provide a means for threading up a textile machine comprising a first and second heater, each having a front and back with said front having means for receiving a yarn strand comprising (1) feeding a yarn strand to the front of said first heater and to said means for receiving said strand; and (2) feeding said strand to the back of said second heater, and over the top thereof to the strand-receiving means in the front of the second heater.

It is another object of this invention to provide a means for threading up a textile machine comprising a first and second heater, each having a front and back with said front having means for receiving a yarn strand, comprising (1) feeding a yarn strand to the front of said first heater and to said means for receiving said strand; (2) attaching the yarn strand to yarn receiving means associated with means constructed and arranged with said second heater for carrying the yarn strand up the back of said second heater and over the top thereof to said means for receiving said yarn strand in said heater; and (3) actuating said yarn receiving means.

It is another object of this invention to provide a heater having a front and back with said front having means for receiving a yarn strand and means constructed and arranged with said heater for engaging a yarn strand and carrying said yarn strand in back of the heater and to said means for receiving a yarn strand in the front of said heater.

These and other objects of the invention will be more readily apparent from the following description with particular reference being placed upon the illustrative drawing.

Briefly, according to the present invention, in a conventional textile machine having an upper and lower heater, the upper heater is equipped with a tape having a yarn clip associated therewith which circumscribes the upper heater. The tape is associated with drive means co-ordinated with the conventional drive means of the textile machine, tape guide means on the heater, and actuating means. An operator will attach a yarn which is to be threaded to the yarn clip, actuate the tape which will carry the yarn up the back of the heater and over the top thereof to the front of the theater for heating the yarn strand prior to a sequential operation which can include feeding the yarn to a pinch roll and/or to a take-up package.

The nature of the invention will be more fully apparent from the following detailed description of preferred embodiments exemplified in the drawing where like numerals are utilized throughout to designate like parts.

Drawing and detailed description

In the drawing, FIGURE 1 is a transverse sectional view through a multi-stage apparatus adapted to practice the present invention;

FIGURE 2 is a perspective view of the upper heater section of the apparatus of FIGURE 1;

FIGURE 3 is a side view of the drive mechanism for the tape of FIGURE 2 showing its mode of operation in phantom lines;

FIGURE 4 is a partial view of a second embodiment of the invention; and

FIGURE 5 is a sectional view of the drive wheel utilized in the embodiment of FIGURE 4.

More specifically, referring primarily to FIGURE 1, an apparatus upon which the present invention is adaptable comprises a multi-station textile machine, each station comprising feed rolls 1 containing a yarn supply, a

first or lower heater 2, a false twist spindle 3, a second or upper heater 4, pinch roll 5, and take-up package 6 or 6*a*. False twist spindles of the type used herein are fully described in Hilbert U.S. Patent No. 3,074,226. Pinch rolls of the type used herein are described in commonly assigned MacDonald et al., U.S. application Ser. No. 504,810 filed Oct. 24, 1965 now Patent No. 3,372,848. Rollers 7 and 8 are employed to apply tension to the yarn strand and to position the yarn in heating contact with heaters 2 and 4. Roller 8 is shown in the operative position in solid lines and in the relaxed position, which permits convenient threading of the machine, in broken lines. Lower heater 2 is approximately 36 inches long and contains a slot or yarn receiving groove 2.1. Upper heater 4 is shorter, being approximately 18 inches long, having slots or grooves 4.1 for receiving the yarn strand. The temperature of the heaters is regulated to the temperature at which the yarn is desired to be processed with the length of the heater enabling the yarn to reach equilibrium temperature with the heater as it travels thereover. The temperature of the heater is maintained uniformly at a point below the temperature at which the yarn melts. Contact heaters in which the yarn is heated by contact with the heater plate are shown in the drawing. However, radiant heaters can be used wherein the yarn never contacts the heating element.

As best seen in FIGURE 2, the upper heater is circumscribed by tape 9 which is in association with drive pulley 10, spring element 11, tensioning or idler pulley 12, and an actuating mechanism 13. The tape held in position on the heater by guides 4.2 and 4.3 carries a yarn clip 14 which preferably is constructed of hard rubber which extends the full width of the tape and protrudes on each side. The actuating mechanism 13 is pivotally attached to the frame of the textile machine at 13.1 by conventional means. When the lever 13 is depressed, roller 13.2 causes the tape to tighten depressing the free end of spring 11. As best seen in FIGURE 3, spring element 11 attached to the frame of the textile machine at point 15 is slotted commencing at fixed point 11.1. Accordingly, pulley 10 passes through the slotted spring when tension is applied to tape 9 by depressed actuating lever 13 to drive the tape. The movement of the spring in relation to the pulley is shown in phantom lines in FIGURE 3. Necessarily, tape 9 must be wider than the slot in spring 11.

During the threading of the textile machine a yarn strand Y is drawn from feed roll 1, passed around tensioning rolls 7 and 8 while roll 8 is in the relaxed position and into alignment with groove 2.1 of heater 2, through false twist spindle 3 and attached to yarn clip 14. Tape actuator 13 is depressed applying tension to tape 9 causing spring element 11 to lower the tape onto the drive pulley connected to the feed roll drive shaft 16. The tape will carry the yarn behind upper heater 4, and since yarn clip 14 extends beyond tape 9, between cooperating yarn drive rolls 17 and 18, down the face of heater 4 where it is deflected into contact with heater grooves 4.1. When the yarn clip carrying the yarn strand has completed one revolution and reached substantially the lower-most point of travel of tape 9, i.e., the starting position, actuator 13 is released causing the tape to be lifted from drive pulley 10 stopping its movement. The yarn strand is then released from yarn clip 14 and passed through pinch rolls 5 and alternate feed rolls 6 or 6*a*.

As fully apparent from FIGURES 1 and 2 of the drawing, the threading means constructed and arranged with the upper heater is extremely simple in construction and in operation. As is further apparent, the present invention permits the threading up of a textile machine employing an upper and lower heater from one convenient level and permits the positioning of the take-up rolls of the machine at a level substantially below the top of the upper heater. This expediency permits the installation of the textile device in locations having less head space than heretofore possible and, further, permits the threading up operation to be accomplished without the use of catwalk or ladder.

The embodiment shown in FIGURE 4 incorporates a means for indexing the tape one revolution. Accordingly, the embodiment employs an actuating mechanism referred to generally by numeral 20. The mechanism comprises a stop means 21 which is integrally attached to spring actuator means 22. When the actuator means is in the relaxed position, stop means 21 engages lugs 23 and 23*a* which are fixedly attached to tape 9. Tape 9, according to this embodiment, is always under the tension of a friction drive wheel which is driven by drive shaft 16 of the textile machine. The friction drive wheel, as seen more fully from a cross-sectional view of FIGURE 5, consists of a hub 24 which is firmly attached to drive shaft 16. A split outer wheel 25 is spaced from rotating hub 24 by split bushing 26. The pressure of the split wheel 25 on bushing 26 is variable through recessed screws 27 and 28. In operation, the outer wheel 25 will rotate with the inner hub 24 if it is not constrained. If the outer wheel 25 is constrained, it will not rotate due to bushing 26 slipping.

In the operation of the device, when actuating means 22 is in the relaxed position, lugs 23 and 23*a* will bear against stop means 21 causing the outer wheel 25 of the drive means to slip against bushing 26. However, when spring actuated means 22 is pushed forward or depressed, freeing lugs 23 and 23*a* from the constraint of stop means 21, the outer wheel 26 will rotate driving tape 9. After yarn clip 14 has moved past stop means 21, actuator means 22 will be released and the tape will make one complete revolution returning to its original position and stop due to lugs 23 and 23*a*, again engaging stop means 21. In utilizing this embodiment, several stations of a multi-station machine can be serviced more conveniently by a single operator. More specifically, an operator can thread one station up through the false twist spindle and attach the yarn to yarn clip 14, depress the actuating mechanism 22 until yarn clip 14 gets past stop means 21, release the actuator and go on to the next station of the machine and start a new threading operation, being confident that the yarn can only make one revolution. Afterwards, the operator can return to the first station, remove the yarn strand from the yarn clip, and complete the threading up operation at that station. Moreover, there is no danger of an inattentive operator permitting the tape to continually move for more than one revolution, possibly fouling the machine.

It is claimed:

1. Apparatus for a textile machine comprising in combination heater means, threading means constructed and arranged with said heater means for receiving a yarn strand and carrying said yarn strand in back of said heater means and over the top thereof into contact with the front of said heater means, and indexing means constructed and arranged with threading means.

2. The apparatus of claim 1 wherein threading means includes an endless tape having holding means fixedly attached thereto for holding a yarn strand.

3. The apparatus of claim 2 wherein said endless tape is under constant tension and driven by friction wheel means comprising hub means fixedly attached to a rotating shaft and split wheel means spaced from said hub means by split bushing means.

4. The apparatus of claim 3 wherein the tape has means fixedly attached thereto in spaced relation to said yarn strand holding holding means and said indexing means includes stop means for engaging said engaging means.

5. A textile machine comprising in combination a lower heater and an upper heater, each of said heaters having a front and back threading means constructed and arranged with said heater means for (a) receiving a yarn strand at a point above said lower heater and below said upper heater, and (b) carrying said yarn in back of said upper heater and over the top thereof into contact with

the front of said upper heater, and indexing means constructed and arranged with threading means.

6. The apparatus of claim 5 wherein threading means includes an endless tape having holding means fixedly attached thereto for holding a yarn strand.

7. The apparatus of claim 6 wherein said endless tape is under constant tension and driven by friction wheel means comprising hub means fixedly attached to a rotating shaft and split wheel means spaced from said hub means by split bushing means.

8. The apparatus of claim 7 wherein the tape has means fixedly attached thereto in spaced relation to said yarn strand holding holding means and said indexing means includes stop means for engaging said engaging means.

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U.S. Cl. X.R.

28—62; 34—162; 57—106; 226—92

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,443,371 May 13, 1969

Alan Ward

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 55, "pratcical" should read -- practical --. Column 2, line 46, "theater" should read -- heater --. Column 4, line 65, before "means" insert -- engaging --; line 66, cancel "holding", first occurrence; line 71, "back" should read -- back, --. Column 5, line 11, before "means" insert -- engaging --; line 12, cancel "holding", first occurrence.

Signed and sealed this 14th day of April 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents